Roland

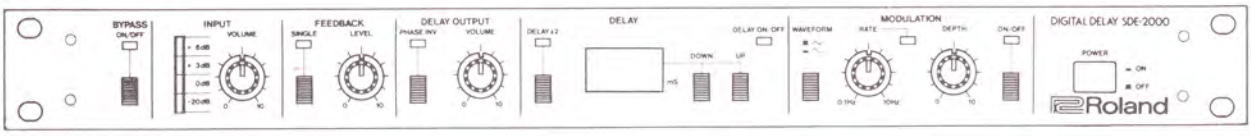
DIGITAL DELAY SDE-2000 OWNER'S MANUAL

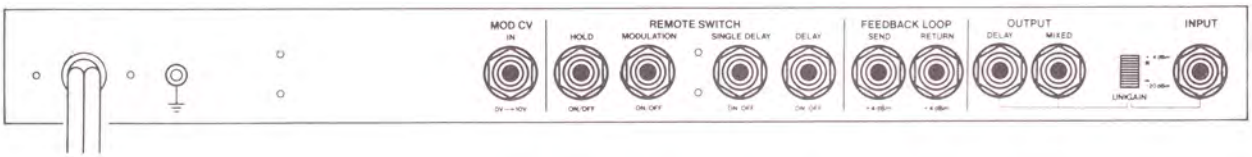
The Roland Rack

Introduction

1. The Roland Digital Delay offers complete flexibility over all the delay parameters (Flanger, Chorus and Echo, etc.).
2. What are contained within the device are controls for Modulation (enabling sweep in the Flanger and Chorus modes) and Feedback which regenerates the signal for more intensity in the Flanger and Chorus modes, and provides multiple decaying echoes in long delay setting.
3. Large capacity memory system (12-bit/16 kbyte RAM) provides low-noise and hi-fidelity sound through full band width.
4. Delay time can be controlled by 1 ms and it is displayed in the Digital Display.

Front and Back Panel Layout





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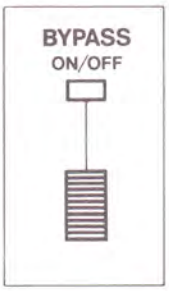
Bypass



Bypass switch (: ON)

This switch is used to directly connect preceding stage instruments (instruments with line inputs, such as a guitar input, passing through a line driver) and succeeding stage instruments (keyboard amp, guitar amp. etc.). Bypass operation functions regardless of on/off operation of the SDE-2000 power supply.

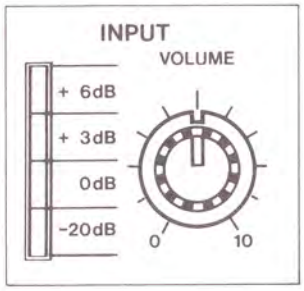
* With the Bypass switch pressed, the OUTPUT MIXED/DELAY are mechanically connected with the INPUT.

Bypass switch indicator

This indicator lights when the Bypass switch is pressed, showing that the SDE-2000 is in Bypass mode.

* When the power supply of the SDE-2000 is off, this indicator does not light, even when the Bypass switch is pressed.

Input



Input volume

This control adjusts input level. Set this control so that the +6 dB segment of the Input level indicator lights when input level is maximum. Distortion starting level is set at +12 dB above 0 VU.

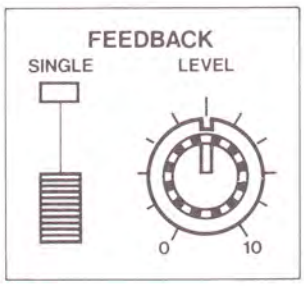
* When this control is set to "5", the output level of the direct sound is equal to the input level.
* When this control is set to "10", input sensitivity is increased by 7 dB.

Input level indicator

This indicator displays the level of the signal passing through Level selection switch and Input volume.

* When Level selection switch is set to "+4 dBm" (–20 dBm), and Input volume is set at "5" position, this indicator displays "0 dBm" with the input signal of "+4 dBm" (–20 dBm).

Feedback



Feedback level

This control adjusts feedback level when the SDE-2000 is used as an echo unit.
Turn clockwise to increase feedback level and counterclockwise to decrease. With this control turned fully counterclockwise, feedback level is zero.

* If this control is set to "8" (3 o'clock position) or over, oscillation may occur.

Single delay switch (: ON)

When this switch is pressed, feedback does not function regardless of feedback level setting.

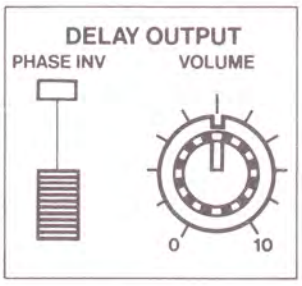
→ See page 5.

Single delay indicator

This indicator lights when the single delay switch is in the single mode.

* This indicator also indicates the state of the single delay remote jack on the rear panel.

Delay Output



Delay output volume

This control adjusts the delay sound volume. Turn clockwise to increase volume, and counter-clockwise to decrease.

* When this control is set at "5", the output level is equal to the input level.
  When this control is set at "10", output level is increased by 6 dB.
* Direct sound remains unchanged.

Delay phase switch (: INV)

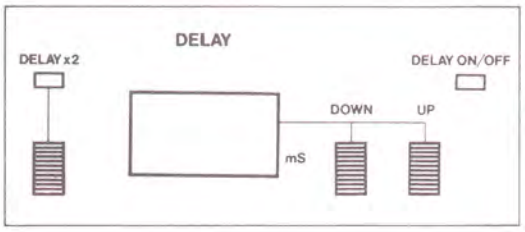
This switch reverses the polarity of delay sound when pressed.

* Direct sound remains unchanged.

Delay phase indicator

This indicator lights when the Delay phase switch is pressed. It lights while delay sound phase is inverted.

Delay



Delay range switch

Press this switch when a long delay, exceeding 320 ms, is used.

	Delay · time	Frequency response
OFF (x1)	0 – 320 ms	10Hz – 16kHz ($^{+0.5}_{-3}$dB)
ON (x2)	0 – 640 ms	10Hz –7.2kHz ($^{+0.5}_{-3}$dB)

Delay range (x2) indicator

This indicator lights when the Delay range switch is pressed.

Delay time selection buttons (up-down)

This button is used to set delay time. Hold down the button you have chosen and press the other button as well, the change will be exceedingly quick and setting will be done swiftly.

Delay time display

This display indicates delay time(ms) in use, with three-digit number.

* The display will change according to the following states.

(a) MODULATION: OFF
The display indicates delay time set by the Delay time selection button. The dot located lower-right hand of Display window flashes when the selected delay time exceeds 100 ms. The flash rate is proportional to the period of delay time being displayed.

(b) MODULATION WITH BUILT-IN LFO
A value displayed immediately before pressing the switch remains fixed and the dot is off.

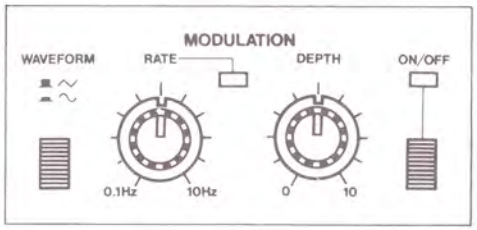
(c) MODULATION WITH EXTERNAL CONTROL VOLTAGE
The display accordingly indicates delay time which is varied by external voltage and the dot flashes with its cycle.
The dot flashes when the delay time exceeds 100 ms.

Delay indicator

This indicator is used to indicate the state of the Delay remote control jack on the rear panel, and lights while delay sound is delivered.

→ See page 5.

Modulation



Modulation waveform selection switch

This is the waveform selection switch for the built-in LFO.

Modulation rate control

This control adjusts oscillation frequency of the built-in LFO from 0.1 Hz to 10 Hz.

Modulation rate indicator

This indicator flashes showing the oscillation frequency of the built-in LFO.

* When modulation is off, this indicator does not flash.

Modulation depth control

This control adjusts depth of the built-in LFO modulation or external modulation.
When this control is turned fully counterclockwise, modulation is not affected.

* When an external voltage is connected to the CV IN jack on the rear panel, built-in LFO is automatically cut; this control also adjusts the depth of the external modulation.

Modulation switch (▼ : ON)

This switch controls on/off operation of the built-in LFO modulation or external modulation. While this switch is used, modulation effect can be turned off at a touch regardless of position of the Modulation depth control.

* While the Delay time selection button is pressed, modulation has no effect.

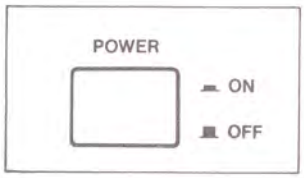
→ See page 5.

Modulation indicator

This indicator lights when the built-in LFO modulation or external modulation is on.

* This indicator also indicates the state of the Modulation remote jack on the rear panel.

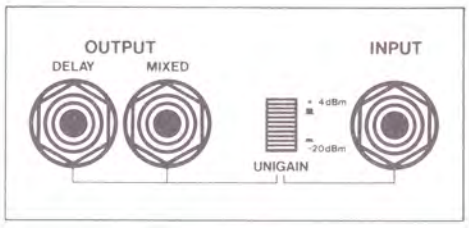
Power



Power switch

Immediately after Power switch is turned on, delay time is set at 0 ms.

Input & Output



Input jack

This is the input jack for the standard plug. Input sensitivity is +4 dBm or −20 dBm when the Input volume is set at "5".

* In case of connecting "Low-level Instruments" such as Electric guitar, Bass Guitar, Mic etc., use the unit to match the level such as Pre-amp, Mic-amp, etc.

Level selection switch

This is the input/output level selection switch.

Example of input/output level selection

- ▼ +4 dBm
  - Roland Rack System
  - Professional Audio Equipment, etc.
- ▲ −20 dBm
  - Electronic Musical Instruments, including keyboards.
  - Standard Audio Equipment, etc.

In some cases, input level cannot be set to the setting values of the above example. In such cases, operate the controls as follows to obtain the proper input level.

(1) Adjust the Input volume so that the input level indicator should show +6 dB when the maximum input is applied to the input jack.

(2) At this time, if the Input volume is between "3" and "10" the input level is proper.

(3) When the Input volume is "1" or "2", set the Level selection switch to "+4 dBm" (projected position).
When only the −20 dB segment of the Input level indicator lights, even when the Input volume is "10", set the Level selection switch to "−20 dBm" (pressed position).

* The input level and output level of the SDE-2000 are equal. Consequently the output level remains unchanged even when the position of the Level selection switch changes.

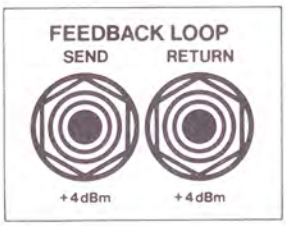
Mixed, Delay output

* In case of using MIXED OUTPUT.
The direct sound and delay sound are mixed and outputted.

* In case of using only DELAY OUTPUT.
Only delay sound is taken out from SDE-2000.

* In case of using both outputs.
The direct sound is provided from MIXED OUTPUT, the delay sound is provided from DELAY OUTPUT.

Feedback



Feedback loop send/return jacks

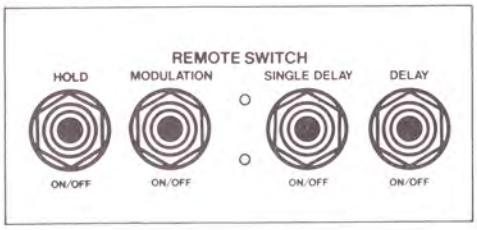
These are input/output jacks for the standard plugs. When the SDE-2000 is used as an echo unit these terminals are used to change feedback characteristics.

* The first delay sound remains unchanged.

* When connecting an instrument to the Feedback send/return jacks, use the one whose gain is adjustable to unity (input: output = 1 : 1).

* The rating input/output level: +4 dBm

Remote Switch

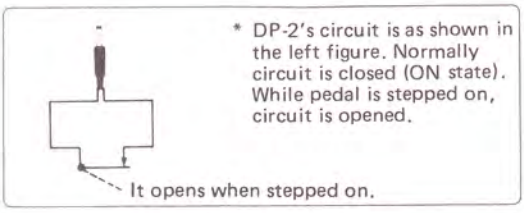


Delay remote jack

Single delay remote jack

Modulation remote jack

Connection of a remote control switch allows On/Off operation. Use Roland's FS-1 Foot Switch or DP-2 Pedal Switch remote control switch.

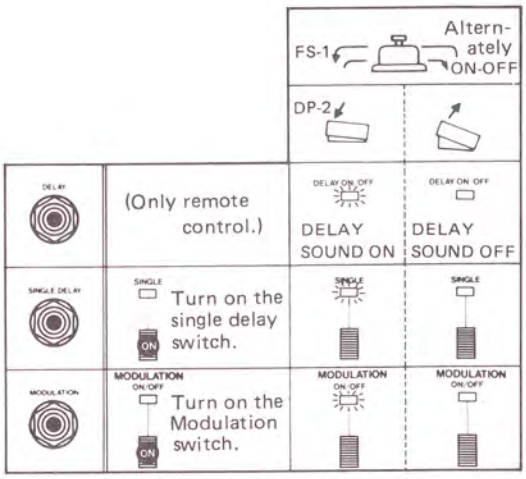


Hold remote control switch jack

When a remote control switch is connected to this jack, repeat hold effect, which allows input sound to be endlessly repeated, is obtained.

Operation:

1. Connect the DP-2 remote control switch to this jack.



2. Operate the Delay time selection button on the front panel to set the longest delay time. (When the Delay range switch on the front panel is at X1 position delay time is approx. 334 ms, and at X2 position, delay time is approx. 668 ms.)

3. When the DP-2 is stepped on while sound is being generated, the sound generated just before is reproduced after 334 ms or 668 ms.

* In normal setting sound is reproduced at the repeating period of 334 ms or 668 ms. The repeating period can be changed by applying a DC voltage to the CVIN jack on the rear panel.

Mod CV

External modulation CV IN jack

This is an external modulation control voltage input jack for the standard plug.
Input CV voltage from the LFO output jack of synthesizers and others to this jack of SDE-2000.

* This input terminal normally functions for voltages ranging 0 ~ +10V.

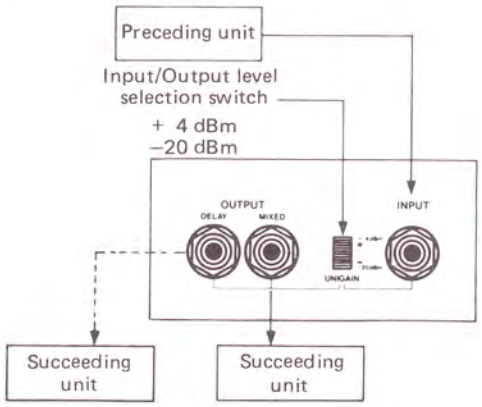
Delaytime-varying under external voltage:

0 V → approx. +15%
10 V → approx. −35%

Connections

Input, Output

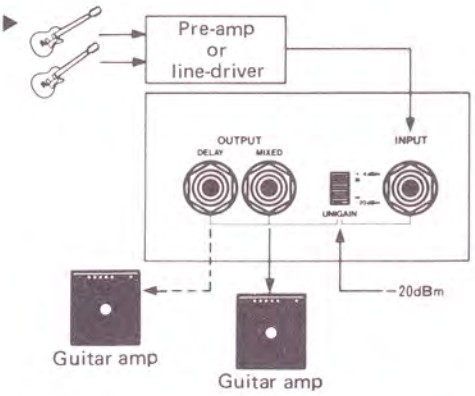
* In this SDE-2000 the rating input/output levels can be shifted between +4 dBm and −20 dBm, in either case the gain will be unity (input level : output level = 1 : 1). Therefore use this SDE-2000 between the two units which send and receive the signal in the rating level of either +4 dBm or −20 dBm. When those two units have different rating output/input levels it is not proper to use them.



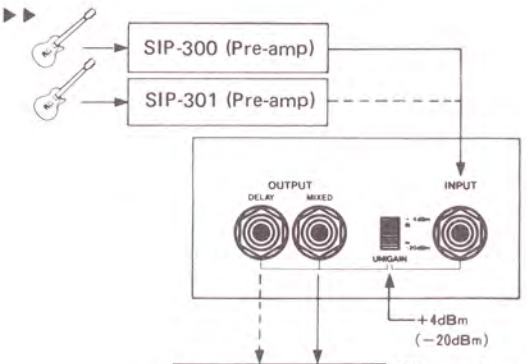
* In case of using both outputs.
The direct sound is provided from MIXED OUTPUT
The delay sound is provided from DELAY OUTPUT

* In case of using only MIXED OUTPUT
The direct sound and delay sound are mixed and outputted.

[When using E. Guitar]

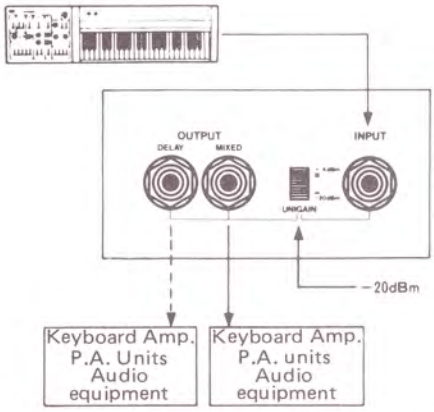


* If the Pre-amp or line-driver is not used, the SDE-2000 can be set up with the guitar amp by using its pre-out and main-in jacks.

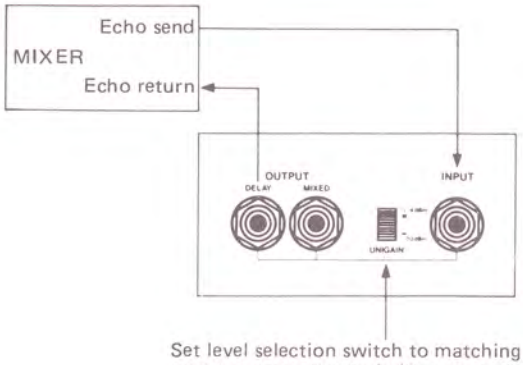


When using effect loop of SIP series, set to −20 dBm position of Input level selection switch.

[When using Keyboard Amp., PA system or Audio equipment]



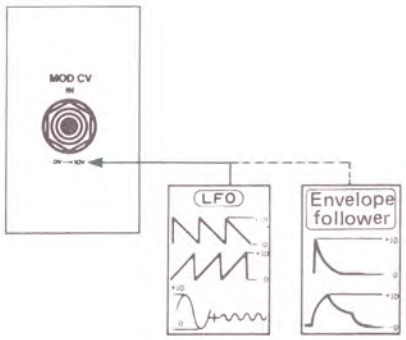
[When using P.A. Mixer]



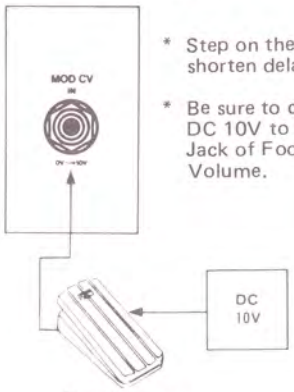
Set level selection switch to matching position according to In/Out level of the connected unit.

External CV Input

*** Modulation using external control signal**



*** Remote control for delay time**



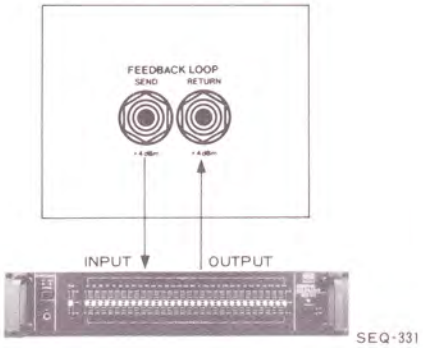
* Step on the pedal to shorten delay time.

* Be sure to connect DC 10V to Input Jack of Foot Volume.

* When an external CV input jack is being connected to the external voltage O.V, delay time will become longer by approximately 15 per cent.

Feedback — Send/Return

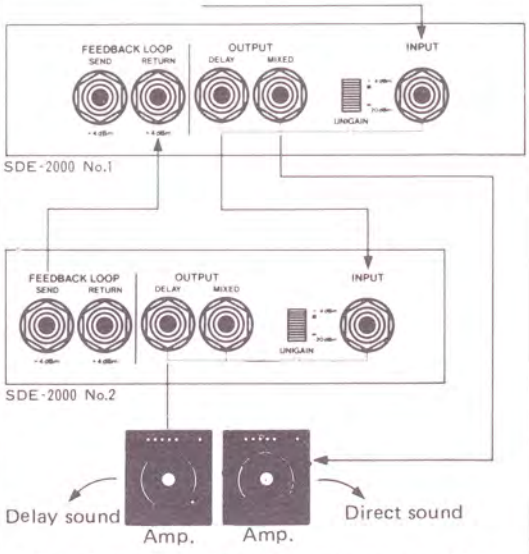
*** Graphic Equalizer**



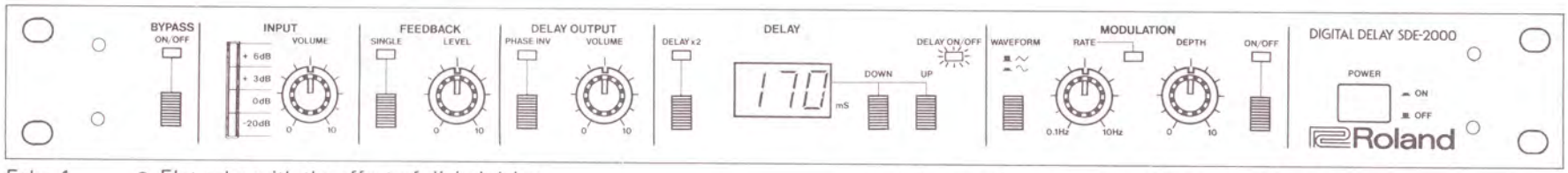
When SDE-2000 is being set in Echo mode, SDE-2000 can provide special effects of Echo by controlling frequency response of feedback.

• SDE-2000 X 2

1.2 second long delay can be obtained by using two sets of SDE-2000.

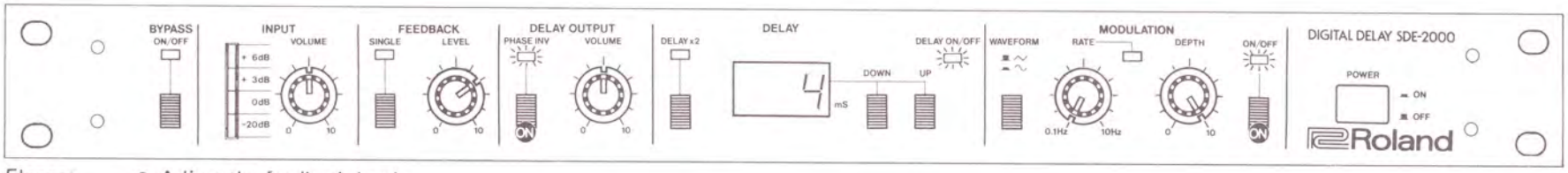


* Feedback level should be adjusted on SDE-2000 No.1. SDE-2000 No.2 should be used with the single delay switch on the front panel held down.



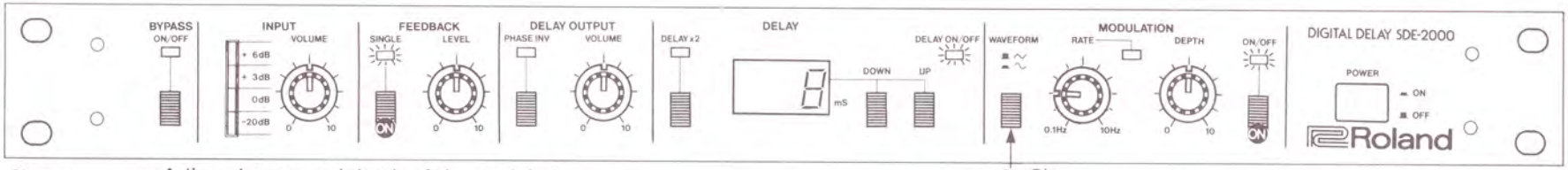
Echo-1

- Flat echo with the effect of digital delay.
- Adjust the feedback level and delay output volume.



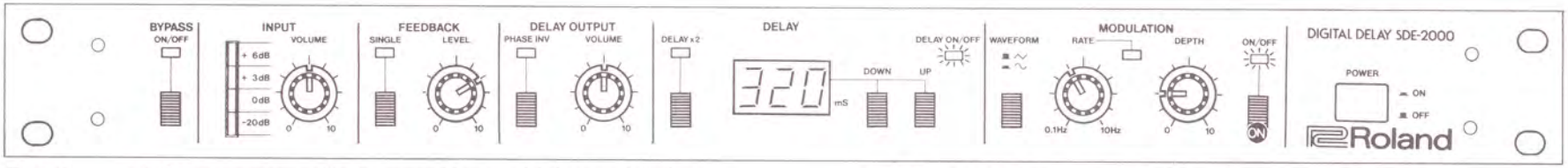
Flanger

- Adjust the feedback level.



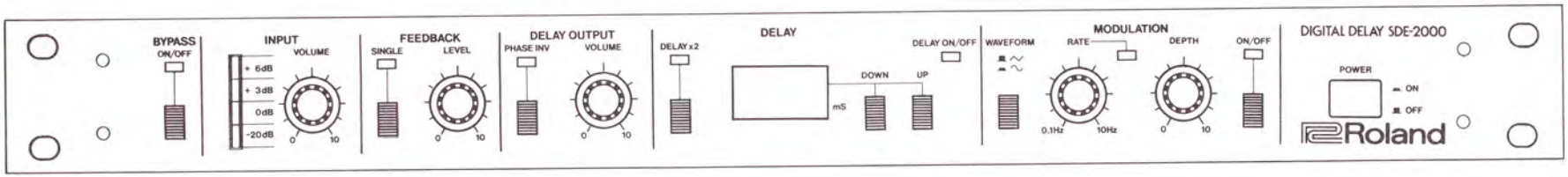
Chorus

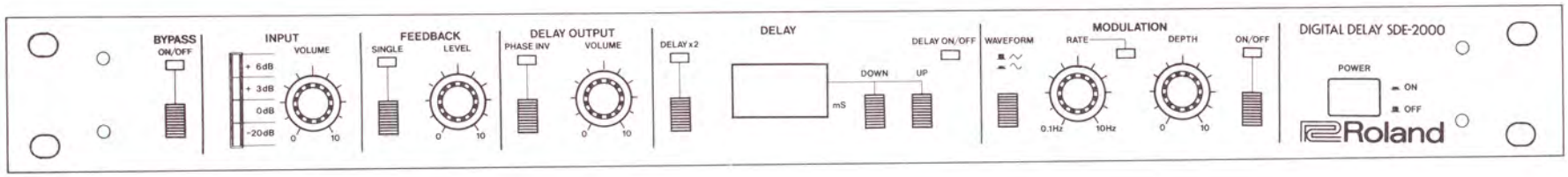
- Adjust the rate and depth of the modulation.



Echo-2

- Spaciousness can be expressed by combining modulation and echo.
- Adjust the rate and depth of the modulation. The rate of the echo repetition and that of the modulation repetition should be almost the same.


BYPASS
ON/OFF
INPUT
VOLUME
+ 6dB
+ 3dB
0dB
-20dB
0
10
FEEDBACK
SINGLE
LEVEL
DELAY OUTPUT
PHASE INV
VOLUME
DELAY x2
DELAY
DOWN
UP
mS
DELAY ON/OFF
WAVEFORM
MODULATION
RATE
DEPTH
ON/OFF
0.1Hz
10Hz
DIGITAL DELAY SDE-2000
POWER
ON
OFF
Roland


BYPASS
ON/OFF
INPUT
VOLUME
+ 6dB
+ 3dB
0dB
-20dB
0
10
FEEDBACK
SINGLE
LEVEL
DELAY OUTPUT
PHASE INV
VOLUME
DELAY x2
DELAY
DOWN
UP
mS
DELAY ON/OFF
WAVEFORM
MODULATION
RATE
DEPTH
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0.1Hz
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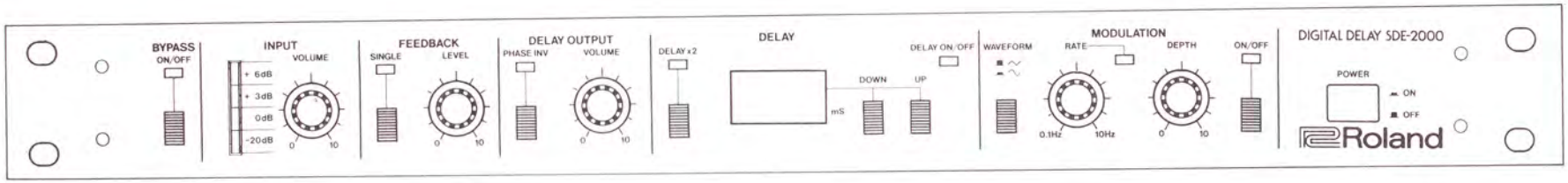
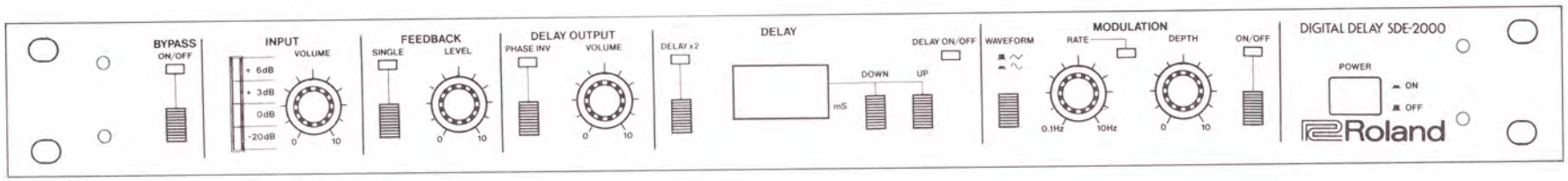
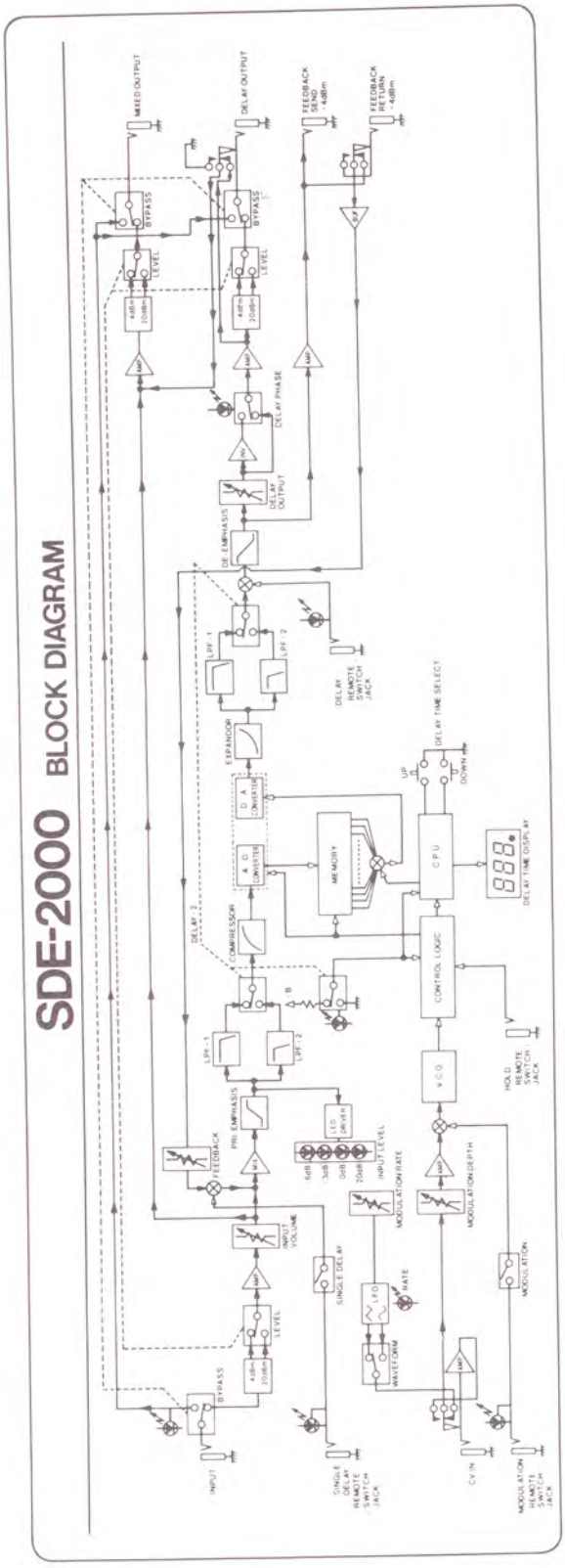
DIGITAL DELAY SDE-2000
POWER
ON
OFF
Roland

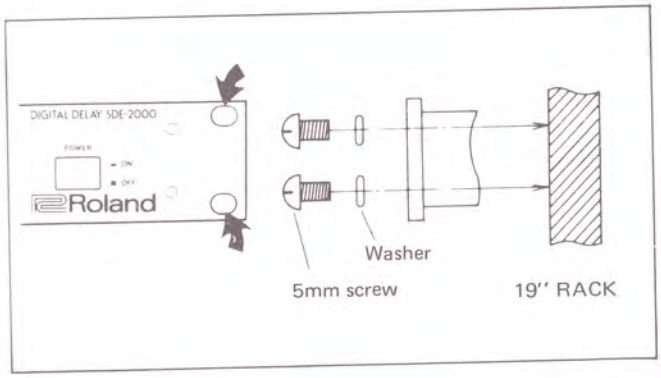

BYPASS
ON/OFF
INPUT
VOLUME
+ 6dB
+ 3dB
0dB
-20dB
0
10
FEEDBACK
SINGLE
LEVEL
DELAY OUTPUT
PHASE INV
VOLUME
DELAY x2
DELAY
DOWN
UP
mS
DELAY ON/OFF
WAVEFORM
MODULATION
RATE
DEPTH
ON/OFF
0.1Hz
10Hz
DIGITAL DELAY SDE-2000
POWER
ON
OFF
Roland


BYPASS
ON/OFF
INPUT
VOLUME
+ 6dB
+ 3dB
0dB
-20dB
0
10
FEEDBACK
SINGLE
LEVEL
DELAY OUTPUT
PHASE INV
VOLUME
DELAY x2
DELAY
DOWN
UP
mS
DELAY ON/OFF
WAVEFORM
MODULATION
RATE
DEPTH
ON/OFF
0.1Hz
10Hz
DIGITAL DELAY SDE-2000
POWER
ON
OFF
Roland



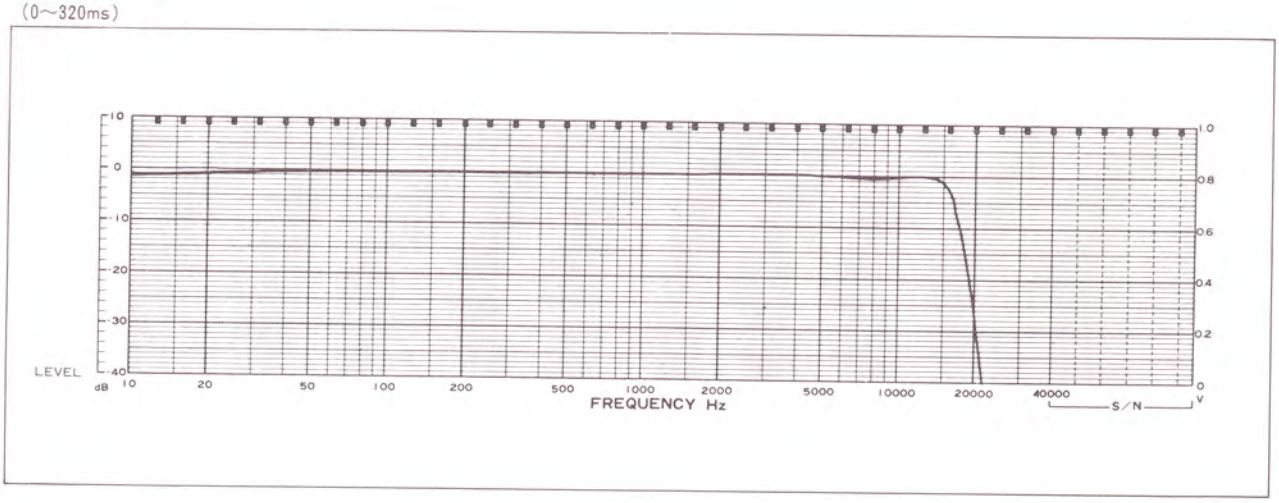
• THE SDE-2000 RACK MOUNTING

The SDE-2000 can be mounted in a standard 19" rack using 5mm screws as shown in the drawing.

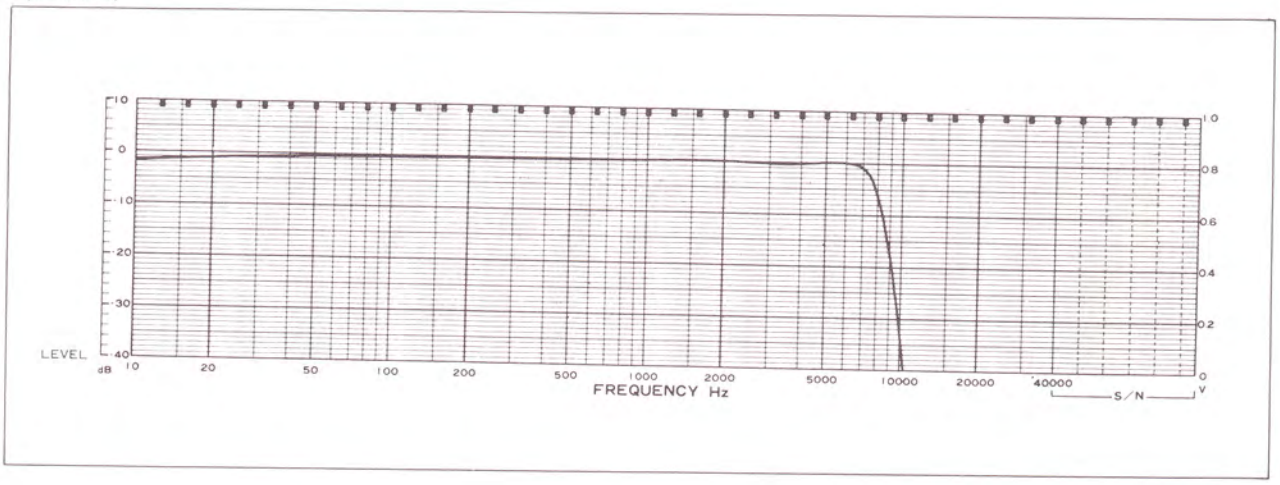


Frequency Response

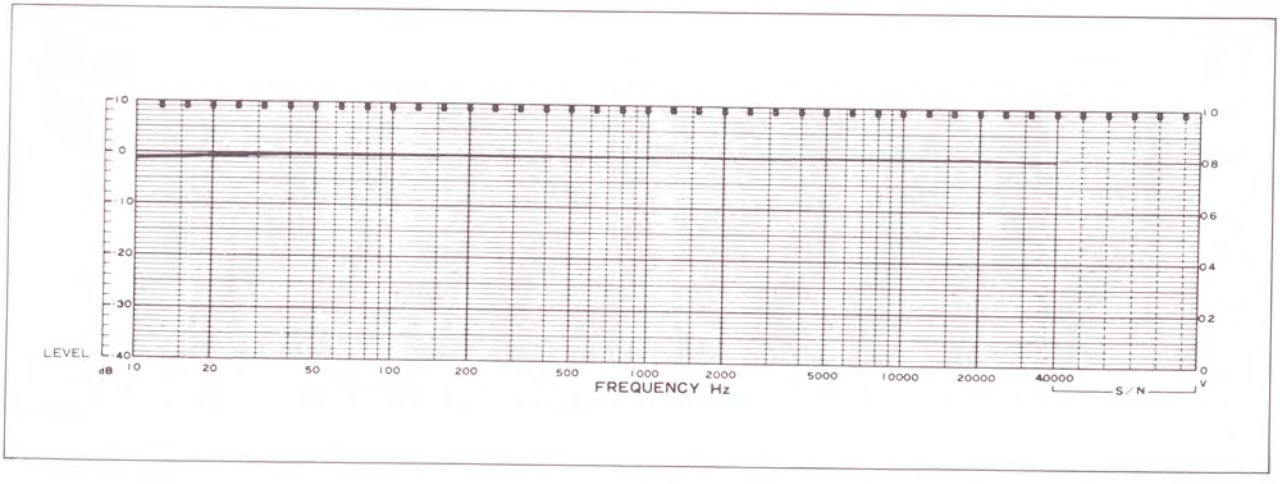
Delay × 1
(0~320ms)



Delay × 2
(0~640ms)



Direct



Specificaitons

*** DIGITAL DELAY * SDE-2000**

Input

Input Level	+4 dBm (+29 dBm max) −20 dBm (+5 dBm max)
Input Impedance	56kΩ

Output

Output Level	+4 dBm (+18 dBm max)/600Ω load −20 dBm (−8 dBm max)/10kΩ load
Output Impedance	100Ω/+4 dBm position 650Ω/−20 dBm position, Mixed output 550Ω/−20 dBm position, Delay output

Feedback

Feedback Send	Level : +4 dBm (+16 dBm max) Output Impedance : 100Ω
Feedback Return	Level : +4 dBm (+19 dBm max) Input Impedance : 78kΩ

CV In

Modulation CV Input	Operating Voltage : 0~+10V (±20V, allowable) Input Impedance : 90kΩ

General Performance

Delay Time	0 to 320 ms 0 to 640 ms (in 1 ms steps)
Delay Accuracy	±0.5%
Frequency Response	10 Hz to 100 kHz +0, −1 dB / Direct 10 Hz to 16 kHz +0.5, −3 dB / Delay, 0 to 320 ms 10 Hz to 7.2 kHz +0.5, −3 dB / Delay, 0 to 640 ms
Signal to Noise Ratio (IHF A) at rated input & output	90 dB / Direct 80 dB / Delay
Dynamic Range (IHF A)	Greater than 112 dB / Direct 90 dB / Delay
Total Harmonic Distortion at rated input & output Ref. 1 kHz	Less than 0.05% / Direct 0.08% typ, 0.2% max / Delay

Controls

Input Volume
Feedback Level
Delay Output Volume
Modulation Rate
Modulation Depth

Switches

Bypass
Single Delay
Delay Phase
Delay Range (x 1, x 2)
Delay Time Selection Buttons (Up, DOWN)
Modulation Waveform (/\/, ∿)
Modulation On-Off
Level Selection (+4 dBm, −20 dBm)
Power On-Off

Display & Indicators

Delay Time Display
Bypass
Input Level
Single Delay
Delay Phase
Delay Range
Delay On-Off
Modulation Rate
Modulation On-Off

Connectors

(1/4" phone jacks)

Input
Output — Mixed, Delay
Feed Back Send
Feed Back Return
Modulation CV Input

Remote Control Capability

(1/4" phone jacks)

Delay On-Off (DP-2, FS-1)
Single Delay (DP-2, FS-1)
Modulation On-Off (DP-2, FS-1)
Hold (DP-2)

Power Consumption

27W(117V), 30W(220V, 240V)

Dimensions

482(W) x 47(H) x 355(D) mm (19 x 1 7/8 x 14 in.)
19" (EIA-1U) rack mount

Weight

5.5kg (12 lbs.)

* Specifications are subject to change without notice.

Roland Corporation